



# United States Department of the Interior

GEOLOGICAL SURVEY

In Reply Refer To:  
WGS-Mail Stop 590

August 16, 1989

## Memorandum

To: Members, DOI Task Force for Coordination of Remote Sensing  
From: Recording Secretary  
Subject: Request for Input to Landsat Implementation Study

The Landsat Implementation Study has been in progress this summer, developing options for continuation of a U.S. Landsat-type capability to follow Landsat 6. DOI comments on the second draft of the Study Report were recently sent to the Study Team, which is composed of Department of Commerce and Department of Defense staff. These comments and the second draft report are attached for your review prior to the August 24 Task Force meeting. This memo requests your input on certain technical aspects of the Study Report. We also would like your comments on the impact of each Landsat follow-on option on your Bureau's use of Landsat-type data.

The report presents five options for follow-on systems, three of which are judged as viable alternatives to follow Landsat 6:

<u>Option</u>	<u>Description</u>
Core Performance System	Repeat of Landsat 5
Baseline Performance System	Repeat of Landsat 6
Enhanced Capability System	Landsat 6 Enhanced Thematic Mapper plus wide field of view sensor and 5-m resolution stereo sensor

As you can see, the Baseline Performance System option would continue the Landsat 6 capability. The Core Performance System option would be a step backward to the current Landsat 4 capability. The Enhanced Capability System option would add a 5-m stereo sensor and a wide field of view (AVHRR-like) sensor. We need to develop a DOI position on the impact of each of these options on DOI uses of this type of technology. To organize your comments, we have prepared a table (attached) and we ask you to identify specific new or expanded applications that Landsat 6, with its 15-m panchromatic band, will offer. Then comment on the impact of each of the three Landsat-6 follow-on options. These could be along the lines of the following: 1) Core Performance System; revert back to 1980's uses, eliminating any new uses

developed for Landsat 6; 2) Baseline Performance System; status quo in terms of applications, may go to other state-of-the-art systems for data for new applications; 3) Enhanced Capability System; new applications possible, such as \_\_\_\_\_.  
Please complete this form with as much detail as you can. All Bureau inputs will be combined into a single DOI input to the final draft of the Study Report.

We also need your comments on any other aspect of the draft report, especially Table 1 and 2 that show a rating of how data from each system meets a variety of applications such as forestry, cartography, and geology. Please review the ratings and offer any suggested changes to the ratings based on your Bureau's use of satellite remotely sensed data. Please note if you think additional applications categories should be added. Separate copies of these tables are included for you to return with your comments.

In summary, please complete the attached Response Table on Landsat Follow-on Options and comment on Tables 1 and 2. Please bring your comments to the August 24 Task Force meeting at SPOT Image Corp., or mail/fax them to me prior to the meeting (Fax number is 703-648-5585, or FTS 959-5585). We prefer to receive one response from each Bureau. Information copies are being sent to alternate members (in some cases by overnight mail) so they can help you in preparing your Bureau response.

Thanks in advance for your input to this study. The nature of the follow-on to Landsat 6 will be determined by the outcome of this study, and DOI should continue to have a strong voice in the review and planning for future systems.



Lawrence R. Pettinger

cc: Alternate Members

## Attachment

## **RESPONSE FORM**

## DOI Comments on Landsat 6 Follow-On Options

## Bureau

Contact Name

1. New or enhanced applications for your Bureau from 15-m panchromatic band on Landsat 6:
  
  2. Impact on your Bureau of each of the following Landsat 6 follow-on options:
    - a. Core Performance System (Landsat 5 repeat)
  
    - b. Baseline Performance System (Landsat 6 repeat)
  
    - c. Enhanced Capability System (Landsat 6 plus enhancements)

TABLE 1. LAND REMOTE SENSING APPLICATIONS AND SYSTEM PERFORMANCE

APPLICATION	CONTINUITY 1996+	SPECTRAL V/NIR & PAN	CHARACTERISTICS SWIR MIR TIR	ORBIT AM/PM	SPATIAL RESOLUTION(m) ≤1 30 100 500+ 5	SWATH (km)	STEREO	ACQUISITION FREQUENCY	TIMELINESS	AVERAGE VOLUME
<u>NATIONAL SECURITY</u>										
--"Core"	X <sup>1</sup>	V/NIR	X	X	AM	--	X	--	95-185	NO
--High Priority	X	BOTH	X	X	AM	X	X	--	185	NO
<u>AGRICULTURE</u>										
--Inventory	X	V/NIR	X	--	--	AM	X	X	--	185
--Statistical Sampling	X	V/NIR	X	X	AM	X	X	--	185	NO
--Forecasting	X	V/NIR	--	--	AM	--	X	X	185 - 2200	NO
--Planning and Management	X	BOTH	X	X	--	AM	X	X	--	60-185
<u>FORESTRY</u>										
--Inventory and Management	X	BOTH	X	X	--	AM	X	X	--	185
--Monitoring	X	BOTH	X	X	AM	X	X	--	60-100	NO
<u>CARTOGRAPHY</u>										
<u>GEOLOGY</u>										
--Rock Types	X	V/NIR	X	X	EITHER	--	X	X	--	60-185
--Structure	X	BOTH	X	X	--	AM	X	X	--	30-185
MEDIA	--	BOTH	--	--	EITHER	X	--	--	30	NO
									as needed	1 day
										LOW

<sup>1</sup> Limited continuity (i.e., Landsat 4/5-type thematic Mapper data only)<sup>2</sup> During growing season(s) only<sup>3</sup> Volume of data required or "through put": HIGH = ≥10 scenes/day; MOD = 5-10 scenes/day; LOW = ≤5 scenes/day

TABLE 1. Continued

APPLICATION	CONTINUITY 1996+ & PAN	SPECTRAL V/NIR & PAN	CHARACTERISTICS	ORBIT AM/PM	SPATIAL RESOLUTION (m) ≤1 30 100 500+	SWATH (km)	STEREO	ACQUISITION FREQUENCY	TIMELINESS	AVERAGE VOLUME
<b>HYDROLOGY</b>										
--Surface Water	X	V/NIR X	X X AM	-- X --	185	NO	7-30 days	7 days	LOW	
--Watersheds	X	V/NIR X	X -- AM	X X --	60-185	YES	annual	30 days	LOW	
--Snow Pack	X	V/NIR X	-- -- AM	X --	60-185	YES	7 days	3 days	LOW	
<b>PLANNING</b>										
--Urban-type uses	X	BOTH --	-- AM	X X --	30-60	YES	annual	30 days	LOW	
--Networks	X	BOTH --	-- AM	X --	--	YES	annual	30 days	LOW	
<b>OCEANOGRAPHY</b>										
--ocean features	X	V/NIR X	X X EITHER	-- X X	185- 2200	NO	≤7 days	1 day	MOD	
--coastal bathymetry	X	V/NIR --	-- -- AM	-- X --	--	185	NO	annual	30 days	LOW
--ice boundaries	X	V/NIR X	-- -- AM	X X --	--	185	NO	≤7 days	1 day	LOW-MOD
<b>ENVIRONMENT</b>										
--Water Quality	X	BOTH X	X X AM	-- X --	185	NO	30 days	30 days	LOW	
--Monitoring	X	BOTH X	X X AM	-- X X	185- 2200	NO	30 days - annual	30 days	LOW	
--Assess damages	X	BOTH X	X X AM	X X --	30-185	NO	as needed	1-7 days	LOW	
<b>GLOBAL CHANGE</b>										
--Sea Levels	X	V/NIR X	X -- AM	X X --	--	60-185	YES	annual	30 days	LOW
--Continental Environments	X	V/NIR X	X X AM	X X X	185- 2200	NO	30 days - annual <sup>1</sup>	30 days	HIGH	

<sup>1</sup> Desertification, deforestation, etc.

TABLE 2. LAND REMOTE SENSING APPLICATIONS AND CAPABILITIES FOR SENSOR CAPABILITIES

<u>APPLICATION</u>	<u>OPTION 1:</u> Core Performance System	<u>OPTION 2:</u> Baseline Performance System	<u>OPTION 3:</u> Enhanced Capability System	<u>OPTION 4:</u> Polar Platform System	<u>OPTION 5:</u> Low Mass System
<u>NATIONAL SECURITY</u>					
--"Core"	X	X	X	--	--
--High Priority	--	X	X	--	--
<u>AGRICULTURE</u>					
--Inventory	X	X	X	X	--
--Statistical Sampling	X	X	X	X	X
--Forecasting	X	X	X	--	--
--Planning and Management	--	X	X	--	--
<u>FORESTRY</u>					
--Inventory & Management	X	X	X	X	--
--Monitoring	--	X	X	--	--
<u>CARTOGRAPHY</u>					
<u>GEOLOGY</u>					
--Rock Types	X	X	X	--	--
--Structure	--	--	X	--	--
<u>MEDIA</u>					

Table 2. Continued

<u>APPLICATION</u>	<u>OPTION 1:</u>	<u>OPTION 2:</u>	<u>OPTION 3:</u>	<u>OPTION 4:</u>	<u>OPTION 5:</u>
<u>HYDROLOGY</u>					
--Surface Water	X	X	X	X	--
--Watershed	--	X	X	--	--
--Snow Pack	X	X	X	X	--
<u>PLANNING</u>					
--Urban	--	X	X	--	--
--Networks	--	X	X	--	--
<u>OCEANOGRAPHY</u>					
--Ocean Features	X	X	X	X	X
--Coastal Bathymetry	X	X	X	X	--
--Ice Boundaries	--	X	X	--	--
<u>ENVIRONMENT</u>					
--Water Quality	--	X	X	--	--
--Monitoring	--	X	X	--	--
--Assess damages	--	X	X	--	--
<u>GLOBAL CHANGE</u>					
--Sea Levels	X	X	X	X	--
--Continental Environments (Desertification, deforestation, etc.)	X	X	X	X	X